Knowledge acquisition task – IFR in AWARE

This task contains two segments: determination of necessary modifications to the underlying decision analysis model to support IFR as well as the current capability to support VFR, and determination of designs for Summary Displays for IFR, complementing the existing VFR displays.

The knowledge was extracted from various user types, including both Commercial Transport and General Aviation IFR pilots, of varying levels of experience.

In summary, pilots prefer data presented graphically rather than textually, with an initial overview mode (filtered to their preferences) and the ability to drill-down for additional details as they are of interest. Pilots want to easily adjust the filtering methods. The drill-down details could include specific values of current parameters, as well as the source of the data.

Pilots would like AWARE to expand in several directions; while all the growth areas are of interest to us and are valid extensions for the pilots, we are limited at this time to expansion in the area of weather alone. Hence, interest in providing data regarding activity of MOAs and congestion data for landing sites is valid, but cannot be addressed within the current scope of this project. Both of these parameters could be used to more accurately calculate fuel requirements ("Endurance") for the flight.

In summary, the weather extensions of interest for IFR could include

- incorporation of visibility / ceiling values during the cruise portion of the flight, both for model calculations and for display purposes
- use of IFR pilot preferences within the decision analysis calculation
- displays based on specific phase of flight parameters; that is, in the depart/climb phase, more emphasis should be put on runway limitations, winds, ceiling and visibility, while during the cruise phase more emphasis should be provided for parameters such as turbulence, icing, and winds aloft.
- indications of areas of VFR/MVFR/IFR restrictions on displays
- more detailed runway/weather presentations, specific to the depart and/or descend sites.

It is expected that we will effectively address the first three points of this list during Q2. The decision analysis model will be expanded to consider visibility and ceiling values along the route, according to the pilot preferences. The execution of the model will utilize the appropriate pilot preferences already defined as VFR or IFR in the pilot definition part of AWARE. A bird's eye view of the flight path could be presented as shown in Figure 1 below. It could include known visibility and ceiling go/no-go criteria along the route, as defined by C. Scanlon of NASA (boxes divided in half, indicating with standard aviation colors whether visibility and ceiling are acceptable, questionable, or outside acceptable limits). It could also include indicators of problematic areas on the flight path, with mouse-over for details. The parameters presented for each phase of flight would be relevant for that phase; that is, turbulence data would not be displayed for

departure phase and runway data would not be available for the cruise phase. Additionally, vertical profiles of the flight are possible, with symbolic indications of the hazard criteria.

In Figure 1, visibility and ceilings are indicated in proximity to the flight path, and in the left side, mouseovers supplies information about parameters relevant to the depart phase. In the right side, parameters for the enroute phase are shown.

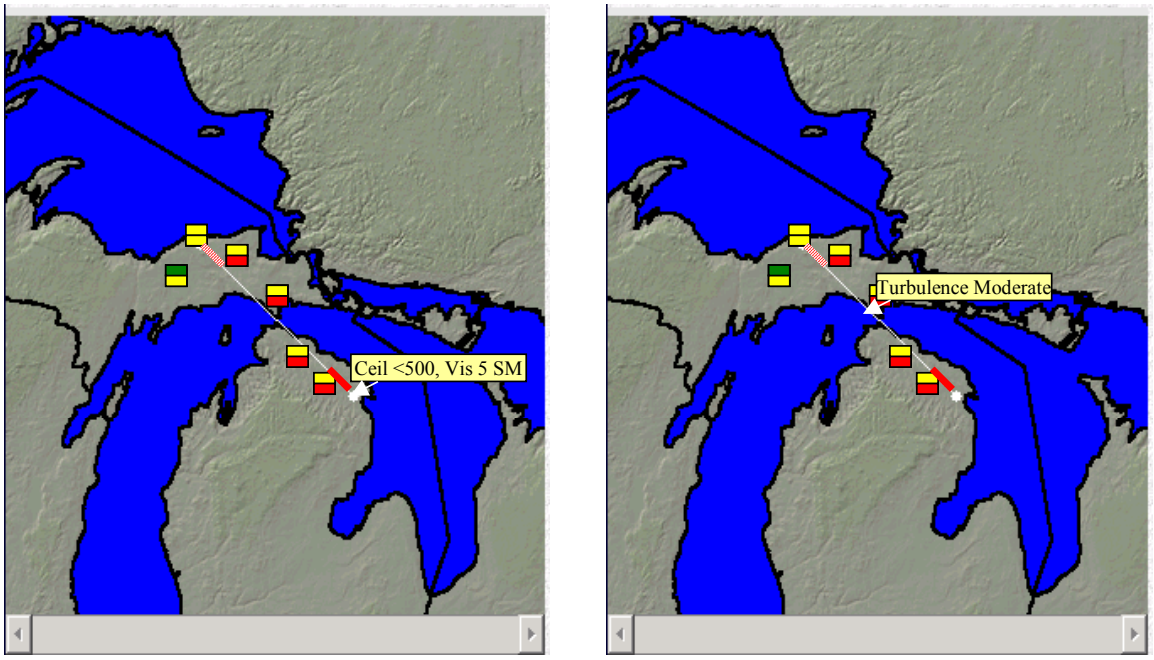

Figure 1: Displays annotated with visibility and ceiling along route, as well as mouse-overs relevant to specific phases of flight.

Another option, simplifying that shown in Figure 1, is to display the worst-case of the two parameters, and allowing the user to mouse-over for the actual values. That option is shown in Figure 2, with circles used to indicate the "or" of the parameters, and mouse-over providing the details of each parameter.

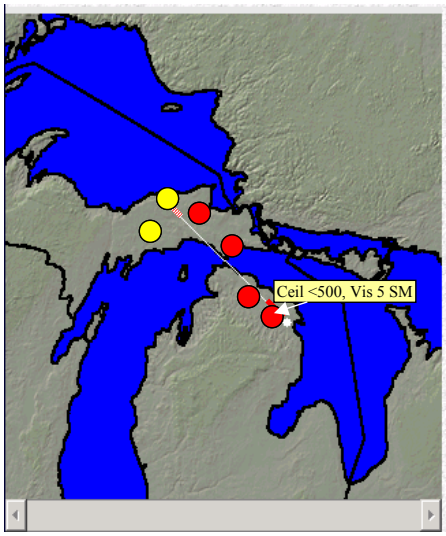

Figure 2: Display of worst-case of ceiling & visibility